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We have received a copy of the Report made by Professor S. W. Burnham, to the "James Lick Trust," of Observations made on Mt. Hamilton, with reference to the location of Lick Observatory, but we are compelled by press of matter to postpone further reference to it until a future date.

We have authority for stating that the Rev. W. H. Dallinger, of England, has consented to become Governor and Professor of Natural Sciences, of Wesley College, Sheffield. We congratulate the trustees of this establishment on having secured the assistance of one who has done so much to elevate the standard of scientific research.

The published papers of Professor Dallinger are models of their kind, and largely quoted by the highest authorities who write on the progress of Biology.

We trust Professor Dallinger, in taking the management of Wesley College, may still be enabled to prosecute his exhaustive microscopical studies, by the methods originally devised by himself, which have already been so fruitful of results, and promise to revolutionize our knowledge of such forms of life.

We are requested to state by the trustees of the Lick Observatories that they will be glad to receive the publications of Observatories, and of Astronomical and Scientific societies, for the permanent library of the Lick Observatory. They inform us that the preliminary work on Mt. Hamilton has already been commenced, and will be prosecuted as rapidly as possible under the circumstances. The small equatorial of 12-inch aperture, has been ordered of Alvan Clark & Sons, and will be placed in position early in 1881; and the great equatorial, meridian circle, and other instruments, will be contracted for at an early day. It is not expected there will be any further delay in putting the Lick Observatory in complete working order, other than that incident to the importance and magnitude of the undertaking.

#### AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.\*

GENERAL BUSINESS—MONDAY, AUGUST 30TH.

The fifth day of the meeting was devoted to general business, to essays in the departments, and to visiting Salem in the afternoon. In the general session some new members were elected, and it was agreed that when the Association adjourned, that it should be to Cincinnati, on August 17, 1881.

The following reports were made:

Mr. E. B. Elliott, on an uniform system of registering deaths, births and marriages; Prof. E. L. Youmans, on the treating of science in public schools; Mr. F. B. Hough, on the preservation of forests; Prof. Harkness also reported certain amendments to the condition of the Association, to be acted on next year. At present there are two full sec-

tions in the association, and it is proposed to establish eight, covering the following branches; A, Physics; B, Astronomy and Mathematics; C, Chemistry and its Application; D, Mechanical Science; E, Geology and Geography; F, Biology; G, Anthropology; H, Economic Science and Statistics. A permanent sub-section of Microscopy is also provided for. These changes will bring the association in close resemblance to that of the British association.

The reading of the papers in the various sections was continued, the subjects of which need not here be stated, as we shall offer a full tabulated list of all the papers read before this association, conveniently arranged for future reference.

TUESDAY, AUGUST 31ST.

The list of essays entered for reading was closed with the number 280. The following officers were elected for the Cincinnati meeting to be held in 1881:—President, Professor G. J. Brush, of Yale College; Vice-President of Section A, Professor A. M. Mayer, of Hoboken; General Secretary, C. V. Riley; Secretary, Section A, Professor John Trowbridge, of Harvard; Secretary, Section B, William Saunders; Treasurer, W. S. Vaux, of Philadelphia; Auditing Committee, Henry Wheatland, of Salem, and Thomas Meehan, of Philadelphia. Resolutions were adopted for a social re-union of the various sections on the second evening of future sessions. Resolutions were also passed recognizing the services to science of the late General Myer of the Signal Service, and the providing for the appointment of a committee to select a series of stars of stellar magnitude for standards, to be reported at the next meeting. Cable congratulations were sent to Michel Eugene Chevreul, senior member of the French Academy upon the completion of his ninety-fifth year. The reading of papers continued.

WEDNESDAY, SEPTEMBER 1ST.

The seventh and last day of the meeting was opened at the Institute of Technology, which had been found so convenient and well adapted for all purposes of the Association. Mr. George Engelmann, of St. Louis, Mo., was chosen vice-president of the Natural History Section. The following gentlemen were elected a committee on stellar magnitudes: Professor E. C. Pickering, chairman, L. Boss, S. W. Burnham, Asaph Hall, William Harkness, E. S. Holden, Simon Newcomb, C. H. F. Peters, Ormond Stone and C. A. Young. The committee is to select a list of standard stars, to which the magnitudes of other stars may be referred. The following gentlemen were elected a committee on standard time: O. Stone, chairman, S. P. Langley, E. C. Pickering, J. R. Eastman, L. Boss, Leonard Waldie, J. K. Rees, G. W. Hough and H. S. Pritchett. The following resolution was passed:—

Dr. Charles T. Jackson, one of the founders and an early president of the Association of American Naturalists and Geologists, having, after many years of illness and seclusion, just passed away, it is fitting that this Association express its high appreciation of his long and valuable services, both as an original investigator in American geology and mineralogy, and as a teacher of chemistry, which will cause his name to be long held in honor and in grateful remembrance.

The following resolutions were passed on Tuesday:

*Resolved*, That the American Association for the Advancement of Science recognizes the value of contemporaneous observations at numerous and well-selected stations, and with standard instruments, as a first and indispensable condition of converting meteorology from a chaotic mass of useless facts into a science.

*Resolved*, That this Association acknowledges its obligations to the first secretary of the Smithsonian Institution for originating, supporting and cherishing such a system of meteorological observations throughout the vast domain of the United States until it had outgrown the resources of the institution, had justified its continuance by proved usefulness, and had awakened the fostering interest of the government.

*Resolved*, That, in the opinion of this Association, the welfare of commerce and agriculture, and the comfort of every member of the community have been promoted by the weather reports and weather charts which have been issued by the chief signal service at Washington, while they have, at the same time, furnished food for scientific thought.

\* Continuation of Report from SCIENCE, Sept. 4.

*Resolved*, That the Association feel and would hereby express the great loss which this service has suffered in the recent death of its chief officer, General A. J. Myer, whose energetic administration of novel duties, seconded by his able corps of scientific assistants, has commanded universal respect at home and abroad.

Professor N. P. Lupton, of Vanderbilt University, was added to the committee on the best methods of scientific teaching in the public schools. The following were chosen a committee on the registration of deaths, births and marriages: E. B. Elliott, F. B. Hough, J. B. Kellebrew, Joseph S. Copes and E. T. Cox.

It was voted yesterday to accept the invitation from Montreal for the meeting of the Association in 1882.

#### CONCLUSION.

The sections had all adjourned in the afternoon. In the evening a general session was held in Huntington Hall, President L. H. Morgan in the chair. About 250 ladies and gentlemen were present. A committee was appointed to confer with the President of the United States on the appointment of a chief signal officer. The committee includes Professors Brush and Barker, Dr. Bell, President Gilman, Professor Harkness, Mr. L. H. Morgan, Professor Clarke and Mr. A. Hall. The Association voted its thanks to those who had helped toward making the re-union of 1880 so pleasantly successful. The respective resolutions were supported by remarks from Professor Harkness, Judge Henderson, Professor Nason, the Rev. Mr. Shackelford, Professor Lattimore, Dr. J. Lawrence Smith, the Messrs. Hovey and Procter, and from the chair. The American Association for the Advancement of Science was then pronounced adjourned, to meet again, for the thirtieth time, at Cincinnati, on the 17th of August, 1881.

WE continue the publication of the addresses, and offer this week that by Dr. Asaph Hall, of Washington, and the Eulogy, by Professor A. M. Mayer, on the late Professor Joseph Henry, both of which we present in full; also abstracts from the following papers prepared by the authors:—The Photophone, by A. G. Bell; Mounds of Illinois, by William McAdams; Determination of the Comparative Dimensions of Ultimate Molecules, by W. N. Norton; Plan of the Cerebro-Spinal Nervous System, S. V. Clevenger; Observations of the Planetary Nebulæ, by E. C. Pickering; Co-efficients of Gas Solutions (Cut) by E. L. Nichols and A. W. Wheeler; The Wyandottes, by J. W. Powell; Ancient Agricultural Implements of Stone, by William McAdams; The Endo-Cranium and Maxillary Suspensorium of the Bee, by George Macloskie; Further Notes on the Pollination of Yucca, and on Pronuba and Prodoxus, by C. V. Riley; Simple Device for Projecting the Vibration of Liquid Films without a Lens, by H. S. Carhart; On Land Snails of the Palæozoic Period, by J. W. Dawson; The Structure of Mica Veins in North Carolina, by W. C. Kerr; Transformation of Planorbis, by A. Hyatt; The Languages of the Iroquois, by Mrs. E. A. Smith.

#### ADDRESS BY PROFESSOR ASAPH HALL.

*Fellow-Members of the Association:—*

Astronomy, in some of its forms, reaches back to the most distant historical epochs, and the changes that it has undergone during this long lapse of time give to this science a peculiar interest. In no other branch of human knowledge have we such a long and continuous history of the search after truth, of the painful struggle through which men have passed in freeing themselves from theories approved by the wise of their own times, and in overthrowing beliefs which had become incorporated into the life and culture of those times. Perhaps the grand array of the heavens, and the vast phenomena which they display, naturally led men to the invention of complicated theories;

but these passed away at last before the test of observation, and the criticism of sceptical men; and the Copernican theory of our solar system, Kepler's laws of elliptical motion, and the Newtonian law of gravitation, gave to Astronomy a real scientific character.

The discovery of the laws that govern the motions of the heavenly bodies, and the construction of the theory of these motions, demanded from practical Astronomy better observations and a more accurate determination of the orbits of the planets and the moon, or of the constants that enter into the problems of celestial mechanics; and this demand led to an improvement in the instruments, and in the art of observing. The astronomers and instrument-makers of England and France led the way in these improvements. The great national observatories of those countries were established, and in England Flamsteed and Sharp, Bird and Bradley, were foremost in raising practical Astronomy to the condition of satisfying the demands of theory. But theoretical Astronomy was soon to receive a wonderful advancement. Perhaps no one contributed more powerfully to this progress than Lagrange. The writings of this man were models of simplicity and elegance, and yet so complete and general are his investigations that they contain the fundamental theorems of celestial mechanics. By the invention and perfection of the method of the variation of the arbitrary constants of a problem, and by the establishment of the differential equations of a planetary orbit depending on the partial differential coefficients of a single function, Lagrange reduced the question of perturbations to its simplest form, and gave the means of deducing easily the most interesting conclusions on the past and future condition of our solar system. To supplement this great theorist there was needed another kind of genius. Combining the highest mathematical skill with unequalled sagacity and common sense in its application, Laplace gathered up and presented in a complete and practical form the whole theory of celestial mechanics. Besides his numerous and brilliant discoveries in theoretical Astronomy, Laplace gave us some of the finest chapters ever written on the theory of attraction,\* and a complete treatise on the calculus of probability.

By such labors as these the questions of Astronomy were brought into order and classified, and the attention of Astronomers was directed better than ever before to the determination of the quantities which must be found from observation. Moreover, the refinement of analysis and the completion of theory brought out new and more delicate questions, not less interesting, and requiring more complete investigation and more powerful instruments. The careful examination and study of the instruments and methods of observation became necessary, as well as complete and rigorous methods of reduction; and finally there was needed a critical and satisfactory method for the discussion of observations. For these last improvements in Astronomy we are indebted chiefly to the astronomers and mechanics of Germany.

Among those who contributed by means of their optical and mechanical skill to furnish Astronomy with the instruments necessary for its further advancement, no one holds a more honorable place than Joseph Fraunhofer. This man began his scientific work at the age of twenty-two, and died at thirty-nine, and yet in those seventeen years he gave to Astronomy great improvements in the manufacture of optical glass, driving clocks for equatorials, and telescopes and micrometers, that in the hands of Bessel and Struve gave to observations a degree of accuracy hardly thought of before. To such men as Fraunhofer and his co-workers, who have carried on and improved the construction of instruments of precision, practical Astronomy owes much; and yet, after all, the principal thing in a science is the man himself. No matter how excellent the instruments may be, the question whether they shall be used for the advancement of the science, and shall contribute the full value of their peculiarities to help towards increasing the accuracy of astronomical determinations.

\* "Ein schönes Document der feinsten analytischen Kunst,"—GAUSS